A Review of the Family Tessaratomidae (Hemiptera: Pentatomoidea) of Taiwan with Descriptions of Newly Recorded Two Genera and Five Species

台灣荔蝽科昆蟲二新紀錄屬及五新紀錄種

Jen-Zon Ho[1, *] and Young-Fa Chen[2]

何健鎔[1, *]　陳陽發[2]

[1] Endemic Species Research Institute, Jiji, Nantou, Taiwan

[2] The Experimental Forest, College of Bio-Resources and Agriculture, National Taiwan University, Nantou, Taiwan

[1] 行政院農業委員會特有生物研究保育中心　南投縣集集鎮民生東路 1 號

[2] 國立台灣大學生物資源暨農學院實驗林管理處　南投縣竹山鎮前山路一段 12 號

* Corresponding author: jenzonho@tesri.gov.tw

* 通訊作者：jenzonho@tesri.gov.tw

Abstract

This paper reviews the family Tessaratomidae from Taiwan which are consisted of five genera and ten species. Of them five species and two genera are newly recorded to the island. They are *Eusthenes femoralis* Zia, 1957, *Eusthenes robustus* (Lepeletier and Serville, 1825), *Eusthenes saevus* Stål, 1863, *Eusthenimorpha jungi* Yang, 1935, and *Mattiphus splendidus* Distant, 1921. They are described and illustrated with living adult color pictures, and provided with a check list of host plants and a key to the genera and the species of Tessaratomidae of Taiwan.

摘　要

本文整理台灣產荔蝽科 (Tessaratomidae) 舊有紀錄種類 3 屬 5 種及 2 新紀錄屬 5 新紀錄種，所有新紀錄種均有詳細形態特徵描述及形態繪圖，分別爲 *Eusthenes femoralis* Zia、*E. robustus*

(Lepeletier and Serville)、*E. saevus* Stål、*Eusthenimorpha jungi* Yang 及 *Mattiphus splendidus* Distant 等 5 種。文末並附有生態照片及寄主植物名錄。

Key words: Tessaratomidae, *Eusthenimorpha*, *Mattiphus*, host plant, Taiwan

關鍵詞：荔蝽科、*Eusthenimorpha* 屬、*Mattiphus* 屬、寄主植物、台灣

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Introduction

The family Tessaratomidae (Hemiptera: Pentatomoidea) are large bugs usually with metallic colors. Adults and nymphs are phytophagus, and thus, most of the species spend their lives on tree leaves and stems. They are found mainly in the tropics of the Eastern Hemisphere but a few in the Western Hemisphere. Tessaratomidae are a small family closely related to the family Pentatomidae. Except for large size and flatted edge nymph, all members of Tessaratomidae look like those of Pentatomidae with robust body and very small head. Sometimes, the former was considered as the subfamily Tessaratominae of the latter. Tessaratomidae comprises 49 genera and about 235 species worldwide (Rolston *et al*. 1993). Some species are pests, such as *Tessaratoma papillosa*, the pest of litchi (*Litchi chinesis*), which injures the fruiter (Drury 1770).

Stål (1865) first established supergeneric groups of tessaratomid bugs at a subfamily level under Pentatomidae. Horváth (1900) recognized nine tribes and established a key to the genera. Kirkaldy (1909) catalogued the world fauna, recognizing 11 tribes of Tessaratomidae. Leston (1955) followed Kirkaldy's classification system, but reducing some of the tribes to subtribes, and describing two new subtribes. The modern tessaratomid taxonomy follows Kumar's (1969) classification system. He divided Tessaratomidae into three subfamilies: Natalicolinae, Oncomerinae and Tessaratominae. The Tessaratominae are subdivided further into three tribes: Prionogastrini, Sepinini and Tessaratomini. This classification system was adopted by Rolston *et al*. (1993) and followed by this study. Schuh and Slater (1995) reviewed the systematics and biology of the family.

There were five known species of Tessaratomidae from Taiwan (Rolston *et al*. 1993), three species recorded by Esaki (1926) and two species by Hsiao (1977) and Zia (1957). This paper adds two newly recorded genera and five newly recorded species to the tribe Tessaratomini of Tessaratomidae of Taiwan. They are described and illustrated, and provided with a key to the genera and the species, and the information of their host-plants (Table 1). All specimens used in this study are preserved in the Endemic Species Research Institute.

Table 1. Host plants of ten Tessaratomidae species

Tessaratomids	Host plants		
	Family	Species	References
Eurostus validus	Fagaceae	*Castanea mollissima**	Ren and Chen 2009
		Castanea sp.	Zhang 1985
		*Castanea seguinii**	Lin *et al*. 1999
		Castnopsis sclerophylla	Zhang 1985
		*Cyclobalanopsis glauca**	Ho and Chen
		*Quercus acutissima**	Zhang 1985
		Quercus fabri	Zhang 1985
	Juglandaceae	*Juglans sigillata*	Ji *et al*. 2001
	Piperaceae	*Piper nigrum*	Yang 1962; Zhang 1985
	Scrophulariaceae	*Paulownia tomentosa**	Lei and Zhou 1998
	Euphorbiaceae	*Sapium sebiferum**	Zhang 1985
	Rosaceae	*Pyrus* sp.	Yang 1962; Zhang 1985
	Sterculiaceae	*Firmiana simplex**	Yang 1962; Zhang 1985
		*Vernicia fordii**	Yang 1962; Zhang 1985
Eusthenes cupreus	Fagaceae	*Cyclobalanopsis glauca**	Zhang 1985
		*Castanopsis indica**	Ho and Chen
		*Quercus acutissima**	Lin *et al*. 1999
	Theaceae	*Camellia oleifera**	Lin *et al*. 1999
	Sterculiaceae	*Vernicia fordii**	Lin *et al*. 1999
	Verbenaceae	*Tectona* sp.	Schaefer and Ahmad 1987
Eusthenes femoralis	Aquifoliaceae	*Ilex* sp.	Zhang 1985; Lin *et al*. 1999
	Fagaceae	*Castanea mollissima**	Zhang 1985; Lin *et al*. 1999; Ren and Chen 2009
	Sabiaceae	*Meliosma pinnata**	Ho and Chen
	Theaceae	*Camellia oleifera**	Zhang 1985; Lin *et al*. 1999
Eusthenes robustus	Araliaceae	*Schefflera octophylla**	Zhang 1985; Lin *et al*. 1999
	Fagaceae	*Quercus* spp.	Lin *et al*. 1999
		*Castanopsis indica**	Ho and Chen
	Juglandaceae	*Juglans sigillata*	Ji *et al*. 2001
Eusthenes rubefactus	Fagaceae	*Cyclobalanopsis glauca**	Ho and Chen
Eusthenes saevus	Betulaceae	*Alnus formosana**	Ho and Chen
	Fagaceae	*Quercus* spp.	Lin *et al*. 1999
	Juglandaceae	*Juglans sigillata*	Ji *et al*. 2001
Eusthenes theseus	Fagaceae	*Cyclobalanopsis glauca**	Lin *et al*. 1999
Eusthenimorpha jungi	Fagaceae	*Castanopsis indica*	Ho and Chen
Mattiphus splendidus	Euphorbiaceae	*Mallotus* sp.	Lin *et al*. 1999

	Fagaceae	*Castanopsis indica**	Ho and Chen
		*Cyclobalanopsis glauca**	Lin *et al.* 1999
		*Quercus acutissima**	Zhang 1995
	Rosaceae	*Prunus* sp.	Zhang 1995
	Scrophulariaceae	*Paulownia* sp.	Zhang 1995; Lin *et al.* 1999
Tessaratoma papillosa	Burseraceae	*Canarium album**	Yang 1962
	Caricaceae	*Carica papaya**	Yang 1962
	Euphorbiaceae	*Ricinus communis**	Yang 1962
	Fabaceae	*Canavalia* spp.	Yang 1962
	Moraceae	*Ficus* spp.	Yang 1962
	Musaceae	*Musa sapientum**	Yang 1962
	Pinaceae	*Pinus* spp.	Yang 1962
	Poaceae	*Saccharum sinense**	Yang 1962
	Rosaceae	*Prunus mume**	Yang 1962
		*Prunus persica**	Yang 1962
		*Prunus salicina**	Yang 1962
	Rubiaceae	*Coffea* spp.	Yang 1962
	Rutaceae	*Citrus* spp.	Yang 1962
		*Citrus maxima**	Yang 1962
		*Citrus limon**	Yang 1962
		Fortunella spp.	Yang 1962
	Sapindaceae	*Euphoria longana**	Hoffmann 1931
		*Koelreuteria formosana**	Ho and Chen
		*Litchi chinensis**	Hoffmann 1931
		Litchi sp.	Schaefer and Ahmad 1987
		Nephelium sp.	Schaefer and Ahmad 1987
	Solanaceae	*Nicotiana tabacum**	Yang 1962
		*Solanum melongena**	Yang 1962

* The species remarked in this table are also exist in Taiwan.

Family TESSARATOMIDAE Stål, 1865

Body large, and shape ovoid to elliptical. Head laterally keeled, very small relative to body size. Bucculae short. Antennae four or five segmented. Ocelli nearer to eyes than to each other. Labium short, reaching apices of fore coxae. Rostrum with 4 joints, reaching the middle of mesosternum; second joint long; last two joints short. Scutellum triangular, reaching the base of membranes without covering corium. Veins of the membrane not reticulate. Hind wings with a hamus. External efferent system of metathoracic gland reduced. Tarsi two or three segmented. The first pair of abdominal spiracles entirely exposed, not hidden by metasternum, easily distinguishable from those of the species of Pentatomidae. Aedeagus with upto four pairs of conjunctival processes. Nymphs with dorsal abdominal glands between terga III/IV, IV/V and V/VI (Yang 1935; Slater 1982; Schuh and Slater 1995; Sinclair 2000).

Key to the genera and the species of Tessaratomidae from Taiwan

1(2) Postmargin of pronotum strongly protrudented backward and covered basal mesoscutellum; head and basal prothorax extended downward; lateral margin of pronotum prominent but smooth..... ..... *Tessaratoma papillosa* (Drury)

2(1) Postmargin of pronotum slightly protrudented backward, not covered basal mesoscutellum;

3(17) Metasternum bulged, equal to stature of coax;

4(5) Metasternum bulged strongly, elevated plate, cross-shaped; metatibia crooked inwardly for male adult..... *Eusthenimorpha jungi* Yang

5(4) Metasternum bulged weakly, like rhombus or pentagon; if crucifix, lateral margin of abdominal sternites VII acute; metatibia not crooked on male adult;

6(18) Posterior femora strongly incrassated, with a long and strong spine from the base of male adult;

7(8) Yellow brindle on lateral margin of tergites more than 1/3 of the tergites length; angle between distal spur and postfemur not greater than 45 degree..... *Eusthenes femoralis* Zia

8(7) Yellow brindle on lateral margin of tergites less than 1/3 of the tergites length; angle between distal spur and posfemur greater than 45 degree;

9(10) Basal of 4th antennal segment primrose yellow; metasternum bulged slightly, like a crucifix; lateral margin of 7th abdominal segment pointed; metatibia not crooked inwardly on male; 8th ventral abdominal segment with a triangular indentation in middle area..... ..... *Eusthenes saevus* Stål

10(9) Basal of 4th antennal segment black; metasternum bulged, like a rhombus, postmarginal spacious and smooth; 8th ventral abdominal segment without a triangular indentation in middle area;

11(12) Ventrum and legs chestnut brown, with gloss but no dark twills; lateral margin of tergites olivaceous, with sorrel stripes on basal area, about 25-35 mm in length..... ..... *Eusthenes rubefactus* Distant

12(11) Ventrum and legs blackness; if not, dark twills presented; stripes on lateral margin of abdominal segments small or absent;

13(16) Small body, less than 30 mm in length; an indentation in the middle area on male genital segment;

14(15) Body color glossy with sparse wrinkle and ornamentation..... *Eusthenes theseus* Stål

15(14) Body color dim with obvious wrinkle and ornamentation, mush rugged, verdigris-green; ventral surface glossy, purple-brown or verdigris-green without dark twills..... ..... *Eusthenes cupreus* (Westwood)

16(13) Large body, longer than 30 mm in length; 3 small lobs on male genital segment..... ..... *Eusthenes robustus* (Lepeletier and Serville)

17(3) Metasternum not bulged, sank into the area between meso-coxa and meta-coxa; posterior femur strongly incrassated with a long and strong spine in male adult but smaller in female; 4th antennal segment yellowish-brown but blackness in basal area; 8th abdominal segment equal between width and length..... *Eurostus varidus* Dallas

18(6) Posterior femora of male not incrassated, without a long and strong spine from the base; metasternum contact with 3rd sternum; antenna black; anterior margin of compound eye with a spine..... ..... *Mattiphus splendidus* Distan

Genus *Eurostus* Dallas, 1851

Type species: *Eurostus validus* Dallas, 1851. designated by Distant, 1902.

1. *Eurostus validus* Dallas, 1851 (Fig. 2A)

Eurostus validus Dallas, 1851. List Hem. 1: 343, pl. 11, figs. 2a-c.

Distribution: China (Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangsu, Jiangxi, Shandong, Shanxi, Sichuan, Yunnan, Zhejiang), India, Hong Kong, Laos, Taiwan, Vietnam (Rolston *et al*. 1993).

Genus *Eusthenes* Laporte, 1833

Type species: *Tessaratoma robusta* Lepeletier and Severin, 1828. by monotype.

2. *Eusthenes cupreus* (Westwood, 1837) (Fig. 2B)

Tessaratoma (sic) *cuprea* Westwood, 1837. Cat. Hope 1: 27.

Eusthenes cupreus Dallas, 1851. List. Hem. 1: 342.

Distribution: Bhutan, Burma, China (Anhui, Fujian, Guangdong, Guangxi, Guizhou, Jiangxi, Sichuan, Xizang, Yunnan, Zhejiang), India (Assam, Sikkim), Laos, Malay Penninsula, Malaysia, Nepal, Sri Lanka, Taiwan, Thailand (Rolston *et al*. 1993).

3. *Eusthenes femoralis* Zia, 1957 (Figs. 1A, 1B, 2C)

Eusthenes femoralis Zia, 1957. Acta Ent. Sin. 7: 430, 431-432, 447.

Material examined: TAIWAN, Urai, on *Meliosma pinnata* (Sabiaceae), 1. X. 2009, 1 male, by J. Z. Ho.

Characters: Male, 30 mm in length and 18 mm in width. Female, 29-30 mm in length and 16-18 mm in width (Zia 1957). Head wrinkled, the lateral lobes rather strongly reflex on each side; antennae fairly closely pubescent. Pronotum broad, anterior margin thickened; sides oblique, much narrowed towards the anterior; posterior angles subprominent, rounded. Scutellum transversely wrinkled; connexivum rather broad. Apical teeth of posterior femora directing towards the apex and marking each with the femur an angle not greater than 45 degrees; apex of genital segment rather convex when viewed caudally.

Coloration: A colorful bug but color highly variable. Dorsum castaneous or purplish castaneous, occasionally olivaceous. Ventrum brown or yellow-brown, Knees and apex of claws black; connexivum dark green or greenish-black, spotted with ochraceous or yellow at segmental bases which occupying 1/3-1/2 area of each segment; apex of scutellum yellow; membrane dark brassy-ocraceous; antennae black but red-brown the basal stained, the extreme apex brown.

Distribution: Southern China (Fujian, Guangdong, Guangxi, Guizhou, Yunnan, Zhejiang), Taiwan (new record) (Rolston *et al*. 1993).

4. *Eusthenes robustus* (Lepeletier and Serville, 1825) (Figs. 1C, 1D, 2D)

Tessaratoma robusta Lepeletier and Serville, 1825. Enc. Meth. 10: 591.

Dinidor (*Eusthenes*) *robustus* Laporte, 1833. Mag. Zool. (Guérin) 2: 64.

Dinidor robustus Spinola, 1837. Essai, 304.

Eusthenes elephas Dohrn, 1863. Stett. Ent. Ztg. 24: 351. (syn. by Vollenhoven, 1868)

Eusthenes polyphemus Stål, 1863. T. E. S. London. 598.

Eusthenes scutellaris Vollehoven, 1868. Faun. Arch. Indo-Néerl., 28.

Eusthenes elephas Walker, 1868. Cat. Het. 3: 468.

Eusthenes jason Stål, 1870. Svensk. Vet. Ak. Hsandl. 9: 232.

Eusthenes touchei Fallou, 1887. Naturaliste, 413.

Eusthenes thoracicus Distant, 1990. A. M. N. H. (7), 6: 61; Id., 1902. Faun., Br. Ind. Rh.: 266.

Material examined: TAIWAN, Shouka, on *Castanopsis indica* (Fagaceae), 15. X. 2009, 1 female, by J. Z. Ho.

Characters: Body size usually large and robustus, like the other species that very complexly variable in color, forms and sizes (Yang 1935). Pronotum broader than the bases of hemelytra, with anterior and lateral margins emarginate slightly and the lateral areas more or less rugulose. Connexivum moderately or broadly exposed. Basal spine of posterior femora of male strong and curved. Abdomen slightly or much broader than the pronotal angles. Apical margin of genital segment of male entire, but convex at middle to form a〝W〞shape. Terminal abdominal segments of female with pleurite X longer than the pleurite IX. Apexes of terminal abdominal segments of female as variable as those of *E. cupreus*. Posterior tibiae of male curved or rather strait (Yang 1935). Body sizes: Male, 30-38 mm long in length and 17-25 mm long in body width; Female, 32-36 mm long in length and 18-23 mm long in width.

Coloration: Body above generally blackish-brown, or reddish-cupreus, sometimes becoming piceous, dark-green, or olivaceous-green; much brown or paler on the corious portions; sometimes more or less tinted with olivaceous-green on the head above. Antennae black, with the base of basal joint rather ochraceous, extreme apex of apical joint rather ferruginous. Antero-lateral areas of pronotum, scutellum, basal or apical areas of corium and connexivum. Scutellum, sometimes, much darker or greenish-darker than other surfaces of body above. Apex of scutellum, basal spot of each abdominal segment in the connexivum distinctly or obscurely ochraceous or concolour with the other areas of connexivum. Body beneath also very variable pale or dark brownish-green, ochraceous, or reddish-cupreus. Rostrum and legs blackish or ocraceous. Tarsi more or less brown, sometimes becoming blackish or concolour to the other portions of legs.

Distribution: Bhutan, Borneo, China (Fujian, Guangdong, Guangxi, Guizhou, Hainan Island, Jiangxi, Sichuan, Yunnan), E. Indies, India (Assam, Bengal, Sikkim), Indo-China, Java, Macao, Malay Penninsula, Sumatra, Suwalesi (Celebes), Thailand, Taiwan (new record), Vietnam (Rolston *et al*. 1993).

5. *Eusthenes rubefactus* Distant, 1901 (Fig. 2E)

Eusthenes rubefactus Distant, 1901. Trans. Ent. Soc. London p. 111.

Eusthenes diomedes Breddin, 1904. Wien. Ent. Ztg. 23: 15-16. syn. by Distant, 1921.

Distribution: Myanmar, India (Assam), Indo-China, Sri Lanka, Taiwan, Vietnam (Rolston *et al.* 1993).

6. *Eusthenes saevus* Stål, 1863 (Figs. 1E, 1F, 1G, 2F)

Eusthenes saevus Stål, 1863. Trans. Ent. Soc. Lond. 1: 597-598.

Eusthenes philoctetes China, 1925. Ann. Mag. N. His. 16: 455.

Eusthenes philoctetes Tang, 1935. Cat. Ins. Sin. 2: 364.

Eusthenes saevus obsoletus Young, 1935. Bull. Fan Mem. Inst. Biol. 6: 114-115.

Material examined: TAIWAN, Auoneda, 29-30. X. 1992, 11 males and 2 females, by J. Z. Ho; Puli, 16. V. 1956, 1 female, by K. S. Lin; Lushan, 14. XI. 1992, 1 female, by J. Z. Ho; Oneda, 4. XI. 1993, 2 females, by J. Z. Ho; Shitou, 6. IX. 1993, 1 male, by C. K. Sunekang; 17. III. 1991, 1 male, by Lo; Taichung, 18. X. 1961, 1 female, by S. C. Chiu; Taihiyan, 23. XII. 1932, 1 male, by J. Z. Ho; Taoyuan, 9. VII. 1993, 1 female, by Lo; Wushinkeng, 22. VII. 1993, by J. Z. Ho.

Characters: Head wrinkled, the lateral lobes not strongly reflex on each side; antennae not pubescent. Pronotum broad, anterior margin not thickened; sides oblique, much narrowed towards the anterior; posterior angle subprominent, rounded. Scutellum transversely wrinkled; connexivum not broad. Basal spine on postfemur of male not as strong as that of *E. cupreus* and apical teeth of posterior femora directing towards the apex and marking each with the femur an angle not greater than 45 degrees. Genital segment of male scarcely sinuate at posterior margin; apex of genital segment rather convex when viewed caudally. Body sizes: Male, 24-28 mm long in length and 12-15 mm long in width; Female, 26-30 mm long in length and 14-16 mm long in width.

Coloration: Above purplish-green, and sometimes is olivaceous-green especially in head, thorax, and connexivum. Body beneath castaneous or purplish castaneous, usually with golden-greenish reflection. Antennae black but apical joint with the base and apex ochraceous (these ochraceous portion variable, narrow or broad), sometimes the apex of third joint is also ochraceous. Legs are red or reddish-brown. Connexvium olivaceous-green, spotted with purplish castaneous at segmental base. Apex of scutellum yellow-brown. Membrane dark brassy-ocraceous.

Distribution: Bhutan, Borneo, China (Anhui, Guangdong, Guizhou, Jiangxi, Shanxi, Sichuan, Yangtze, Yunnan, Zhejiang), India (Assam, Sikkim), Indo-China, Malay Penninsula, Taiwan (new record) (Rolston *et al.* 1993).

7. *Eusthenes theseus* Stål, 1870

Eusthenes theseus Stål, 1870. Sv. Vet. Akad. Handl. 9: 231.

Distribution: China (Fujain, Guizhou, Sichuan, Xizang, Yunnan, Zhejiang), India (Sikkim, W. Bengal), Indo-China, Laos, Nepal, Taiwan, Vietnam (Rolston *et al.* 1993).

Genus *Eusthenimorpha* Yang, 1935

Type species: *Eusthenimorpha jungi* Yang, by original designation.

8. *Eusthenimorpha jungi* Yang, 1935 (Figs. 1H, 1I, 2G)

Eusthenimorpha jungi Yang, 1935. Bull. Fan Mem. Inst. Biol. 6: 118-119.

Material examined: TAIWAN, Shouka, on *Castanopsis indica* (Fagaceae), 15. X. 2009, 1 male, by J. Z. Ho.

Characters: Compared to *Eusthenes* and *Eurostus* species, the body shape of this species is more ovate. Antenna with the base of basal joint, second joint longer than third but shorter than the fourth. Connexivum well-exposed. Metasternal elevated plate much lower and transversely cross-shaped, mesosternum rather uniformly and longitudinally sulcated. Anterior femora with a very small spine on the anterior side near the apex, intermediate and posterior femora with two spines near apex; posterior femora also with a stronger spine near the base, but without two rows of small spines or tubercles at the underside, all these spines are black. Abdomen not elevated at base. Body sizes: Male, 24-26 mm long in length and 16-17 mm long in width; Female, 24-27 mm long in length and 16-17 mm long in width.

Coloration: Body above uniformly dark-green, beneath uniformly ochraceous. Antennae piceous and the apical area of the apical joint rather ochraceous. Apex of scutellum ochraceous, lateral margins of pronotum brownish-black, membrane bronze, sternum with pale golden-greenish reflection; femora ochraceous; tibiae, tarsi, and rostrum fuscous.

Distribution: China (Zhejiang, Hainan Island), Taiwan (new record) (Rolston *et al*. 1993).

Genus *Mattiphus* Amyot and Serville, 1843

Type species: *Mattiphus carrenoi* Amyot and Serille by monotype

9. *Mattiphus splendidus* Distant, 1921 (Figs. 1J, 1K, 2H)

Mattiphus splendidus Distant, 1921. Entomol. 54: (698) 166.

Material examined: TAIWAN, Shouka, on *Castanopsis indica* (Fagaceae), 15. X. 2009, 1 male, by J. Z. Ho.

Characters: This species is smaller than other tessaratomid species in Taiwan. Second joint of antennae is the longest, third a little shorter than the fourth. Pronotum and scutellum more or less finely transversely wrinkled. Lateral margins of pronotum uniformly rounded and reflexed. Corium thick but very finely punctate. Body sizes: Male, 20 mm long in length and 13 mm long in width; Female, 22-27 mm long in length and 13-16 mm long in width (Zia 1957); breadth between pronotal angles in male about 11-15 mm, in female about 13-16 mm.

Coloration: Head, pronotum and scutellum resplendent green, but darkish-ochraceous in central lobe of head and sometimes the lateral margins being irregularly darkish-ochraceous, and ochraceous or darkish in the apex of scutellum. Corium pale castaneous with greenish reflexions at costal and apical areas; membrane very pale castaneous. Connexivum greenish-black, ochraceous (distinct or obscure), spotted at the base of each abdominal segments. Body beneath resplendent-green or golden-green or pale-ochraceous (discoloured). Head beneath, rostrum and legs

pale castaneous; antennae castaneous, becoming darker towards apex.

Distribution: China (Fujian, Guangxi, Guizhou, Sichuan, Yunnan), Indo-China, Laos, Taiwan (new record) (Rolston *et al*. 1993).

Genus *Tessaratoma* Berthold, 1827

Type species: *Tessaratoma papillosa* Drury, 1770 (= *Cimex papillosa* Drury, 1770). disignated by Distant, 1902.

10. *Tessaratoma papillosa* (Drury, 1770) (Fig. 2I)

Cimex papillosus Drury, 1770. III. Nat. Hist. 1: 96-97, pl. 43 fig. 2. (species name in index)

Cimex chinese Thunberg, 1783. Nov. Ins. Sp. 2: 45, pl. 2 fig. 59. syn. by Wolff, 1880.

Cimex sinensis (sic) Gmelin, 1790. Syst. Nat. ed. 13, 1: 2158.

Edessa papillosus Fabricius, 1803. Syst. Rh.: 150.

Tessaratoma sonneratii Lepeletier and Serville, 1825. Enc. Meth. 10: 590-591. syn. with *Cimex chinesis* Thunberg, 1783 by Mayr, 1866.

Tessaratoma ossacruenta Gray, 1832. Griffith's Anim. Kingd. 15: 239.

Tessaratoma javana Burmeister, 1834. Nov. Act. Leop. Carol 16 Suppl.: 293.

Distribution: Australia, Borneo, Burma, China (Fujian, Guangdong, Guangxi, Guizhou, Hainan Island, Jiangxi, Kiangsi, Kweichow, Kwangtung, Manchuria, Sichuan, Yunnan), E. Indies, India (Assam, Hindustan), Indo-China, Indonesia (Lombok Island), Japan, Java, Laos, Lesser Sunda Island (Timor Island), Malaysia, Philippines, Sierra Leone, S.E. Asia, Sri Lanka, Sumatra, Taiwan, Thailand, Vietnam (Rolston *et al*. 1993).

Discussion

Many Tessaratomidae species are colorful and polished when alive, and the characteristics of body color are used for description in previous references. However, the body color of these species are variable and sometimes with high similarity among relative species and the body color of living bugs and dried specimens are quite different. Thus, it might be difficult to identify these species with these characters. Generally, the living tessaratomids in Taiwan are emerald-green, olive-green, or purplish green, but evolve into dark-green or purple bronze immediately after abiosis and become ochraceous or caramel to darkish-ochraceous in several days later. Therefore, the body color is not a reliable character for the taxonomy of Tessaratomidae. In addition, the nymphs of tessaratomids are also colorful and particular in flat body size, and it is also not easy to be identified. However, only a few notices on these nymph character states were shown. It is suggested that more importance should be placed on these nymph character states when consider the systematic relationships between these species. It could be more suitable than what has been done hitherto, for Tessaratomidae species classifying and nymphal morphological characteristics is also need to be taken into consideration in studies on taxonomy.

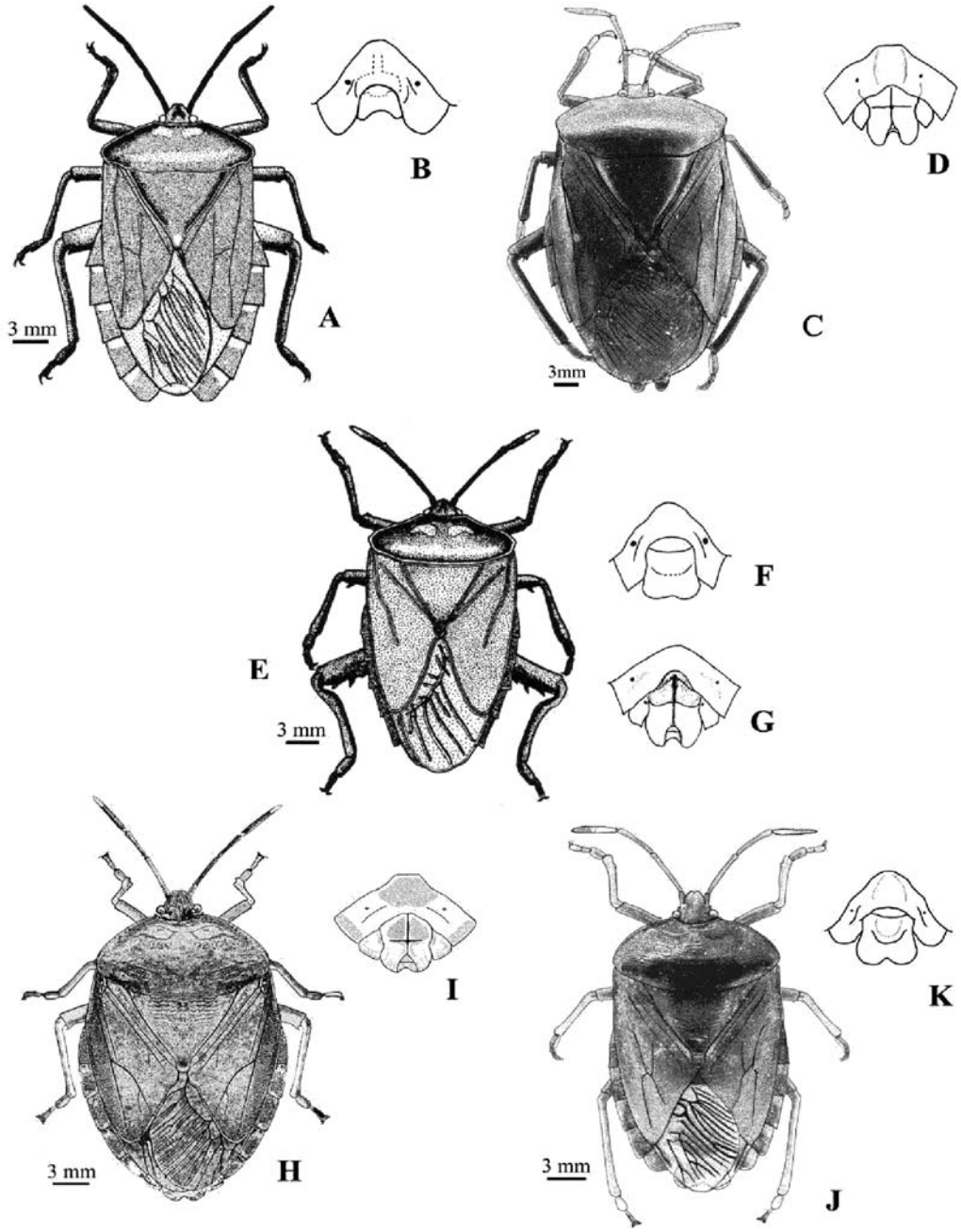

Fig. 1. New record species of Tessaratomidae in Taiwan. A-B, *Eusthenes femoralis* Zia and genital segments of male; C-D, *Eusthenes robustus* (Lepeletier and Serville) and genital segments of female; E-G, *Eusthenes saevus* Stål and genital segments of male (F) and female (G); H-I, *Eusthenimorpha jungi* Yang and genital segments of female; J-K, *Mattiphus splendidus* Distant and genital segments of male.

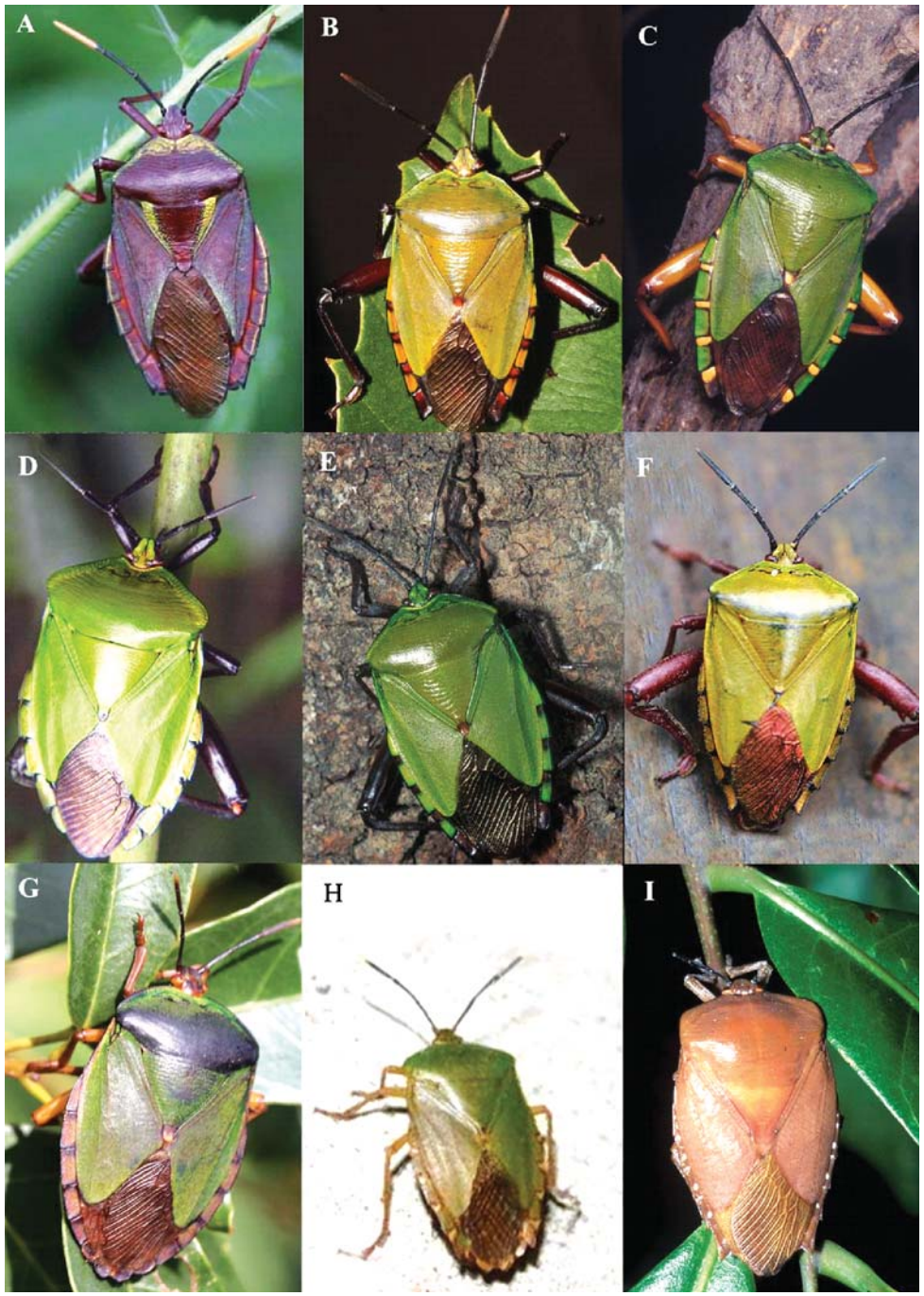

Fig. 2. Tessaratomidae of Taiwan. A, *Eurostus validus* Dallas; B, *Eusthenes cupreus* (Westwood); C, *Eusthenes femoralis* Zia; D, *Eusthenes robustus* (Lepeletier and Serville); E, *Eusthenes rubefactus* Distant; F, *Eusthenes saevus* Stål; G, *Eusthenimorpha jungi* Yang; H, *Mattiphus splendidus* Distant; I, *Tessaratoma papillosa* (Drury).

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